

CLAIMS

1. A worked molybdenum-alloy material, subjected to nitriding, which has high corrosion resistance, high strength, and high toughness, comprising: fine nitride particles formed by subjecting a nitride-forming-metal element dissolved to form a solid solution in an untreated worked molybdenum-alloy material to internal nitriding, the fine nitride particles being dispersed inside the worked molybdenum-alloy material subjected to nitriding; and a molybdenum nitride layer formed by subjecting a worked structure or a recovered structure at the surface of the untreated worked molybdenum-alloy material to external nitriding, the molybdenum nitride layer being provided at the surface of the worked molybdenum-alloy material subjected to nitriding.

2. The worked molybdenum-alloy material subjected to nitriding according to Claim 1, wherein the molybdenum nitride layer at the surface of the worked molybdenum-alloy material subjected to nitriding comprises at least any one of δ -MoN, γ -Mo₂N, and β -Mo₂N.

3. The worked molybdenum-alloy material subjected to nitriding according to Claim 1 or 2, wherein a layer between the molybdenum nitride layer and the matrix in the inside of the worked molybdenum-alloy material subjected to nitriding

has a worked structure or recovered structure.

4. The worked molybdenum-alloy material subjected to nitriding according to any one of Claims 1 to 3, wherein the inside of the worked molybdenum-alloy material subjected to
5 nitriding has a recrystallized structure.

5. A method for manufacturing a worked molybdenum-alloy material subjected to nitriding according to any one of Claims 1 to 4, comprising the steps of: subjecting an untreated worked alloy material in which at least any one of
10 titanium, zirconium, hafnium, vanadium, niobium, and tantalum is dissolved to form a solid solution in a molybdenum matrix to multi-step internal nitriding treatment including a stepwise increase of the treatment temperature, and then subjecting the worked alloy material to external
15 nitriding treatment.

6. The method for manufacturing a worked molybdenum-alloy material subjected to nitriding according to Claim 5, wherein the internal nitriding treatment is performed with a nitrogen gas, and then the external nitriding treatment is
20 performed with an ammonia gas.